

Townes-Brocks Syndrome

Description

Townes-Brocks syndrome is a genetic condition that affects several parts of the body. The most common features of this condition are a malformation of the anal opening (imperforate anus), abnormally shaped ears, and hand malformations that most often affect the thumbs. People with this condition often have at least two of these three major features.

Other signs and symptoms of Townes-Brocks syndrome can include kidney abnormalities, mild to profound hearing loss, eye abnormalities, heart defects, foot abnormalities, and genital malformations. These features vary among affected individuals, even within the same family. Mild intellectual disability or learning problems have been reported in about 10 percent of people with Townes-Brocks syndrome.

Frequency

The prevalence of this condition is unknown. It is difficult to determine how frequently Townes-Brocks syndrome occurs because the varied signs and symptoms of this disorder overlap with those of other genetic syndromes.

Causes

Mutations in the *SALL1* gene cause Townes-Brocks Syndrome. This gene provides instructions for making a protein that is involved in development before birth. The *SALL1* protein acts as a transcription factor, which means it attaches (binds) to specific regions of DNA and helps control the activity of particular genes that direct the formation of many different tissues and organs before birth.

It is uncertain how *SALL1* gene mutations result in the features of Townes-Brocks syndrome. Most mutations lead to the production of an abnormally short version of the *SALL1* protein that malfunctions within the cell. The malfunctioning protein is thought to interfere with normal copies of the *SALL1* protein, which are produced from the other copy of the *SALL1* gene that does not have a mutation. This interference prevents the normal proteins from regulating gene activity. In addition, the malfunctioning protein may interact with other proteins, disrupting their function. For example, some research indicates that the abnormally short *SALL1* protein interferes with proteins that control the formation of cellular structures called cilia. Cilia are important for the structure and

function of many types of cells and the normal development of several tissues. Abnormalities in cilia can disrupt development and may contribute to the features of Townes-Brocks syndrome.

Some rare mutations prevent the gene from making any protein; this reduces by half the amount of SALL1 protein produced in cells. A shortage of functioning SALL1 protein, due to either type of mutation, likely impairs the regulation of genes that direct the development of many different organs and tissues before birth. Interference by the malfunctioning SALL1 protein, if present, may disrupt other developmental processes and contribute to the birth defects associated with Townes-Brocks syndrome.

[Learn more about the gene associated with Townes-Brocks Syndrome](#)

- SALL1

Inheritance

This condition is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is sufficient to cause the disorder.

Other Names for This Condition

- Anal-ear-renal-radial malformation syndrome
- Deafness-imperforate anus-hypoplastic thumbs syndrome
- Imperforate anus-hand and foot anomalies syndrome
- Renal-ear-anal-radial syndrome (REAR)
- Sensorineural deafness-imperforate anus-hypoplastic thumbs syndrome
- Townes syndrome

Additional Information & Resources

Genetic Testing Information

- Genetic Testing Registry: Townes-Brocks syndrome 1 (<https://www.ncbi.nlm.nih.gov/gtr/conditions/C4551481/>)

Genetic and Rare Diseases Information Center

- Townes-Brocks syndrome (<https://rarediseases.info.nih.gov/diseases/7784/index>)

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD) (<https://rarediseases.org/>)

Catalog of Genes and Diseases from OMIM

- TOWNES-BROCKS SYNDROME 1; TBS1 (<https://omim.org/entry/107480>)
- TOWNES-BROCKS SYNDROME 2; TBS2 (<https://omim.org/entry/617466>)

Scientific Articles on PubMed

- PubMed (<https://pubmed.ncbi.nlm.nih.gov/?term=%28%28townes-brocks+syndrome%5BTIAB%5D%29+OR+%28townes+syndrome%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D>)

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Last updated June 1, 2020